Land Use Change Assessment (LUCA™)

Visualizing Past Urban Development

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Background

Numerous external pressures affect the ability of the military services to maintain force readiness. Some of these pressures result from land use changes in and near installations. Military bases generate noise, dust and smoke that may disturb nearby neighbors. Conversely, those neighbors may install bright lights that interfere with night training activities and cell towers that interfere with soldier communications. Such land use changes can also greatly impact use of airfields and low altitude flight. Installation managers need tools to identify and monitor land use changes, and to determine risks to military training and testing, with an eye to mitigating these risks.

The Land Use Change Assessment (LUCA™) methodology identifies *local & regional level* land use trends and impacts on military installation missions. It can provide technologies and data to help installations and units proactively plan to protect the mission sustainability of DoD's current and future capabilities and assets. A LUCA™ analysis:

- results in a time series of the landscape changes over 30 or more years
- can be completed for a single installation or an entire region, at varying detail.

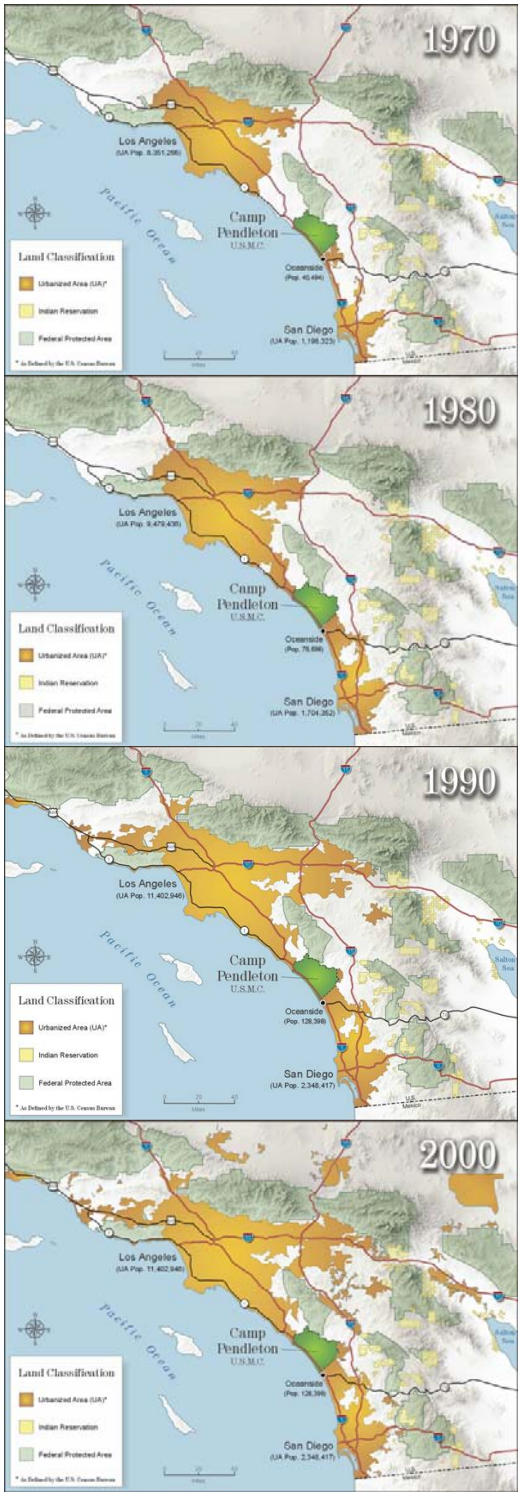
Expertise and Products

Conduct Trend Analysis

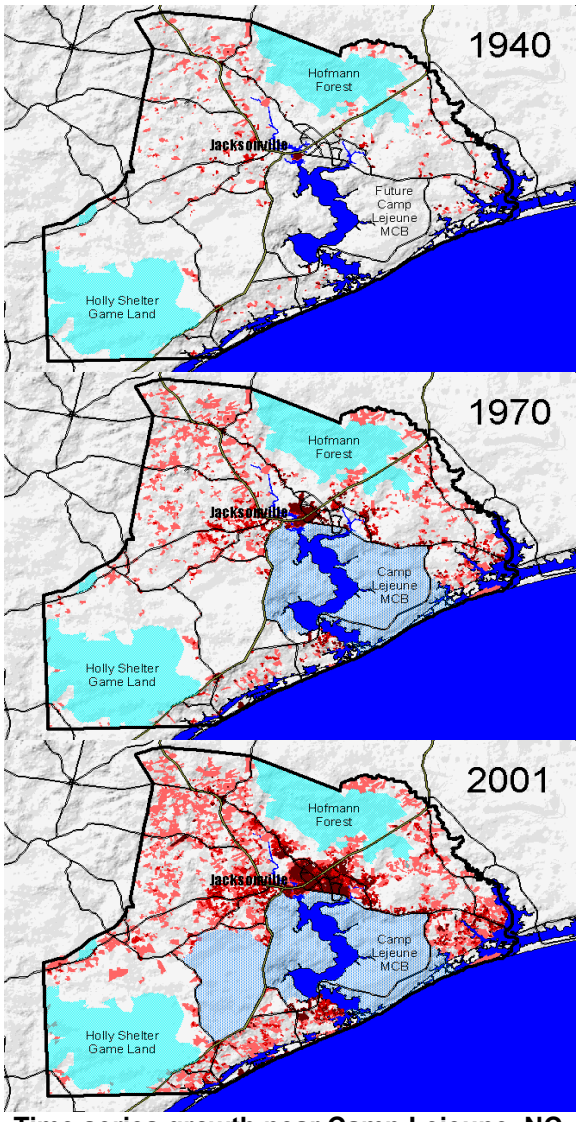
Trend analysis can collect and portray historic and current trends in risk factors. Trends are drawn from the analysis of historic land use and land cover maps, satellite images, and other sources.

Identify Potential Boundary Conflicts

As more of the land adjacent to installations is used for residential and commercial purposes, the likelihood for conflicts increases. Identifying emerging conflicts allows planners to take mitigating proactive actions.



Urban Growth Around Camp Pendleton, CA



Time series growth near Camp Lejeune, NC.

Compile GIS and Imagery Data

Regional risk analysis can use contextual GIS information and datasets from the National Land Cover Data (NLCD) and North American Land Characterization (NALC). The NLCD provides data for the early 1990s and uses standard land cover classes. The NALC data provides imagery for the 1970s, 1980s, and early 1990s in a consistent georeferenced set. Analysis of these images provides an objective evaluation of land cover and landscape ecology trends. Other data sources can be useful for determining land use changes.

Create Maps Showing Land Use Trends and Development Patterns

The available data sets are carefully analyzed using the LUCA™ methodology to create a series of regional maps showing land use trends and changes over time. These maps can be created for a specific installation and nearby communities or along specified flight routes. Similar regional analyses can be done for a cluster of installations and their neighboring communities. These maps are particularly useful for identifying and discussing trends in regional development patterns and sustainability indicators over time.

Benefits

Land use change can have significant, permanent implications on opportunities to test and train, but the decades-long process of change is easy to overlook in installation planning. Regional analysis allows installation managers and planners to answer the following questions:

- Which installations are the most at risk from exogenous factors?
- How will land change affect military operations at a given installation?
- Over decades, how much of the regional threatened and endangered species habitat in a region might be impacted by land use change?
- What strategic land-use changes might impact the military's ability to train in the future?

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